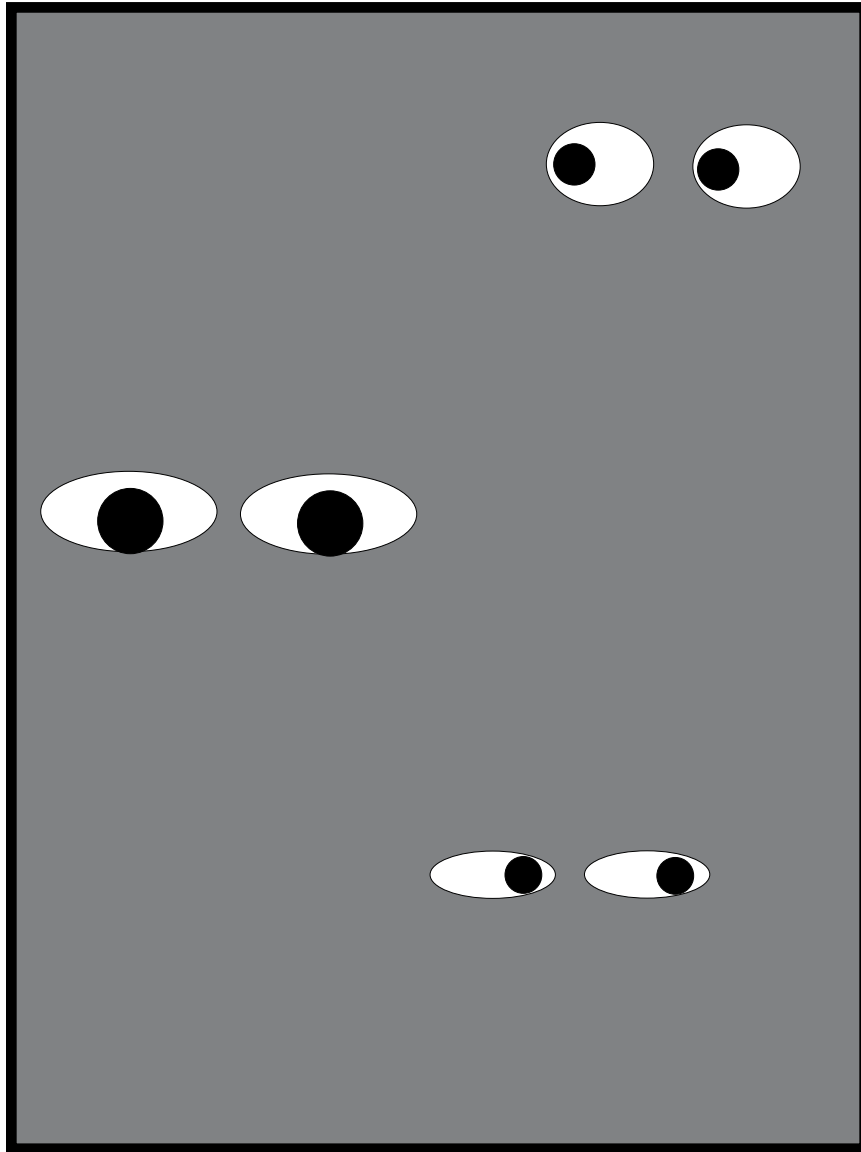


Wolf Ridge Environmental Learning Center
6282 Cranberry Rd, Finland, MN 55603 • 800-523-2733 (MN, WI) • 218-353-7414



NIGHT HIKE

LESSON PLAN



Students in the Dark

NIGHT HIKE

WOLF RIDGE CLASSES:

Animals:

Animal Signs
Beavers
Birds
Small Mammals
Snowshoe Hare
White-tailed Deer
Wildlife Management

Plants:

Forest Ecology
Plant Study
Trees and Keys
Wetlands Ecology

Aquatics:

Lake Study
Stream Study
Fisheries Management
Frozen Lake Study

Earth Science:

Acid Rain
Geology
Weather

Human Culture and History:

Living Lightly
Nature's Timing
Ojibwa Heritage
Ojibwa Snowshoe
Seeds of Change
Voyageur Life

Personal Growth:

Adventure Ropes Course
Rock Climbing

Group Building:

Basic Survival
I.R.S.T. Games

Outdoor Recreation:

Beginning Orienteering
Competitive Orienteering
Canoeing
Cross Country Skiing
Superior Snowshoe
Superior View Hike

Evening Activities:

Astronomy
Block Printing
Creative Expressions
Creature from Wolf Lake
Dream Catchers
Lake Superior Game
Night Hike
Owl Pellets
Paper Making
Star Lab
Woodland Art
Volleyball

Naturalist Presentations:

Bats
Fur Trade
History of the North Shore
Logging Camp Life
Raptors
Wolves

Class Description: A Night Exploration Hike

Students will hike a designated route, stopping at various points to do activities. These activities will lead to a better understanding of night time communications and senses. Students will have the opportunity to sit alone and experience the night environment.

Total time: 1 1/2 hours (flexible length)

Audience: 6-20 students, any age

Activity level: strenuous

Travel: 1 1/4 mile

Total uphill travel: 320 feet



About Wolf Ridge

Wolf Ridge is an accredited residential environmental education school for persons of all ages. We offers immersion programs which involve direct observation and participation in outdoor experiences. Wolf Ridge programs focus on environmental sciences, human culture and history, personal growth, team building and outdoor recreation.

Our Mission

To develop a citizenry that has the knowledge, skills, motivation and commitment to act together for a quality environment.

What We Do

We meet our mission by:

- Fostering awareness, curiosity and sensitivity to the natural world.
- Providing lifelong learning experiences in nature.
- Developing social understanding, respect and cooperation.
- Modeling values, behaviors and technologies, which lead to a sustainable lifestyle.
- Promoting the concepts of conservation and stewardship.



Wolf Ridge Campus

Photo by Jim Brandenburg



Wolf Ridge

Environmental Learning Center

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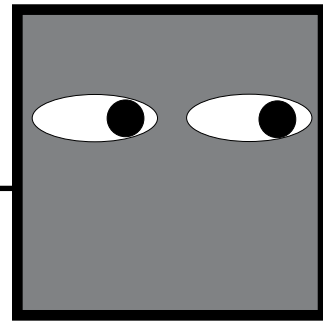
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www.wolf-ridge.org

Wolf Ridge is an equal opportunity educator and employer.

NIGHT HIKE



OUTLINE:

I. Set-up (10 min.)

II. Introduction (10 min.)

- Greeting/Grabber
- Learn Names
- Behavior Guidelines
- Class Overview
- Assess Learner Level

III. Listen to Night Sounds Tape (5 min.)

IV. Hike (65 min.)

- Stop 1 - Night Vision/Colored Paper Squares
- Stop 2 - Bioluminescence/Lifesavers
- Stop 3 - Smell/Scent Jars
- Stop 4 - Hearing/Bat & Moth Game
- Stop 5 - Communication/Animal Calling
- Stop 6 - Solitude Solo

V. Conclusion (10 min.)

- Discuss solitude solo
- Check colored paper squares
- Review

VI. Clean-up (10 min.)

VII. Appendices

- Optional Activities
- Equipment
- Resources
- Safety Management
- Possible Routes and Map



CONCEPTS:

- All living things acquire physical and behavioral adaptations to be successful in their environment.
- People can overcome their fear or discomfort of the darkness through knowledge of and familiarity with it.
- Humans learn about their world through their senses, investigation and experimentation.



OUTCOMES:

Upon completion of the Night Hike class students will be able to:

1. Compare how use of our senses differs in the darkness and light.
2. Describe something about the night experience that was new and surprising.
3. Discuss how their emotions about the night have changed following the hike and activities.



MN GRADUATION STANDARDS:

Wolf Ridge has aligned the Center's entire curriculum to Minnesota Department of Education Academic Standards. The Center maintains a curriculum standards matrix for the following subject areas:

- Science
- History and Social Studies
- Language Arts
- Mathematics
- Arts

The Matrices are organized by grade level and subject area, listing Strand, Sub-Strand, Standards, and Benchmarks. Every class addressing a benchmark is also noted. As the primary student audience at Wolf Ridge is from 4th-12th grade, the matrices address these grade levels. Teachers may request that their students focus upon a specific benchmark while attending Wolf Ridge.

Copies of our matrices are available on the Wolf Ridge web site at www.wolf-ridge.org, found under the "Education" menu. If you cannot access the matrices via the website, request a printed copy by calling 218-353-7414 or e-mailing us at "mail@wolf-ridge.org".

INSTRUCTOR NOTE:

Pick and choose activities according to the time you have available, as well as the length of hike you plan. Do not feel obligated to follow this lesson plan. These are only suggestions.

INSTRUCTOR NOTE:

Depending on the season, your night hike may take place when it is still light outside. The only activities that do not work well in daylight are the color squares and candle staves. For the "sparkies" with Lifesavers, the information can still be discussed, but Lifesavers should be handed out at the end of class. Students can then take them back to darkened dorm rooms and watch them with each other or in the mirror.

INSTRUCTOR NOTE:

Check students for proper footwear, raingear and other clothing as they enter the room. Send those who aren't dressed adequately back to the dorm to change.

I. Set-up (30 min.)

From the kit room pick up a night hike equipment kit which includes 5 scent jars, three blindfolds, colored paper squares, enough wintergreen lifesavers so everyone can have one. Also bring along a first-aid kit and flashlight or two in case of emergencies. Get a tape player from the kit room and night sound tape from the kit. **You will need a fresh dollar bill to use the "Expert Scent Jar."**

II. Introduction (10 min.)

Greeting/Grabber

Greet the students as they enter and make sure all the students are appropriately clothed. Explain that you do not want them to use flashlights if they brought them because that will distract from everyone's experience. Let them know you will confiscate them for the remainder of the evening if they use them. Read the following quote:

"To go in the dark with a light is to know the light.
To know the dark, go dark. Go without sight,
And find that the dark, too, blooms and sings,
and is traveled by dark feet and dark wings."
– Wendell Berry

Learn Students' Names

Take a few minutes to learn the names of your students and welcome them individually to the class. Repeat their names and strive to use them in every communication. This may be challenging to do at night. Close your eyes and memorize their voices.

Set Behavior Guidelines

Discuss clearly and specifically which behaviors you expect from your students during the next hour and a half. Explain the need for respect - for you, for each other, and for the night environment.

Overview of Class

People are rarely outside at night purposefully to simply enjoy the night's beauty. Since most people live in cities, many of us may have never had the opportunity to experience total darkness. Fear of the night is somewhat justified when we realize that humans rely mainly on sight, which diminishes at night. The ability to see is also lessened for other animals; however, their sense of hearing or smell may be much more acute than ours. Our fear comes from the idea that something might know about us before we realize it is there. We will use our senses tonight to experience a new place - the darkness. During our hike we will stop at various places to participate in some activities that help us better understand the night.

Assess Learner Level

During the introduction, find out what the students already know about night life and discuss night fears. "Who has ever been camping or out at night in a dark place?" "Were you scared?" "Why?" Have students share stories. Tell them tonight's hike should help them understand some new things about the night. Knowledge is key in overcoming fear.

III. Listen to Night Sounds Tape (5 min.)

Before starting on the hike, listen to the tape with common natural night sounds. The tape contains owl, wolf, woodcock, ruffed grouse, and frog songs. Play the tape through once just listening. Then play the tape again stopping after each call to practice. You can expect to hear the bird and wolf calls year around. Listen for the others in the appropriate season. The chart shows peak seasons.

IV. Hike (65 min.)

Head away from the buildings and lights following one of the designated night hike trails. Refer to map and suggested hikes at the end of the lesson plan. Let the students know that it may be difficult to see at first but their eyes will adjust.

A. Stop 1 - Night Vision/Colored Paper Squares

Once the group is out of sight of the lights, stop and discuss how vision works.

Lining the retina are two kinds of cells, cones and rods. Cones can perceive color, but need much light to do so. Most nocturnal animals have only rods, which pick up trace amounts of light, but not color. We see "ghosts" because rods detect movement from the corners of our eyes, but when we turn to look, cones can't pick up enough light to see clearly. To get a clear picture at night, try focusing next to the object and using peripheral vision instead of looking directly at it.

Rhodopsin is the chemical in rods that is sensitive to light, but it breaks down in strong light, and must be manufactured each time we go back into the dark. Our rods become 100 times more sensitive in 5 minutes of darkness, and pupils 10 times as large. Therefore, we can see 1000 times better in 5 minutes. Within an hour we can see 1 million times better. Vitamin A is a precursor to rhodopsin, so a diet deficient in Vitamin A (from liver and yellow and red vegetables) may cause night blindness. In order to gather more light, nocturnal animals also have a tapetum, or reflector, on their retinas (dogs, cats, deer, raccoons, rabbits, beaver, etc.), making their eyes shine at night. They also have larger pupils or slit pupils if they are active both day and night (cats, snakes).

To demonstrate how rhodopsin breaks down in the presence of light, try the following activity:

Candle stare - Have all the students close both eyes while you light and place a candle in the center of the group. Then have the students uncover one eye and stare at the candle for 1-2 minutes. Blow out the candle. Cover and uncover each eye to see which eye has better vision. The eye that was covered should have much sharper vision because the rhodopsin is still present.

To demonstrate that humans cannot see color as well at night, try the following activity:

Color squares - Give each student a square of different colored construction paper. Have the student guess what color they think it is. Once they decide on a color have them place the paper square in a pocket. At the conclusion of your hike when you are back by the lights, have the students look at the pieces of paper and see if their guesses were correct.

Continue on.

INSTRUCTOR NOTE:

Peak Sounds by Month

Boreal Owl - Feb. & March

Saw-whet Owl - Feb. &

March

Great-horned Owl - Feb.

Barred Owl - All winter

Woodcock - May & June

*Ruffed Grouse - Early spring
through fall*

*Spring Peeper - End of April
through June*

Wood Frog - May

American Toad - May

*Western Chorus Frog - End
of April through May*

B. Stop 2 - Bioluminescence/Lifesavers

Occasionally when people are out at night they will see lights or glowing coming from places where there is no electricity. Perhaps they are seeing a UFO, but more likely they are seeing one of the numerous plants or animals that naturally produce light. This is called bioluminescence and it works differently in each species. Unlike most familiar lights that are accompanied by heat, bioluminescence is a cold light.

Fireflies are common insects that give off light. There are about 50 different kinds of fireflies in the United States with different colored lights, and different rhythms of flashing their lights. The “fuel” in the firefly’s light is a substance called luciferin. It reacts when it comes in contact with oxygen, but only when another substance, luciferase is present. Also produced by the firefly, luciferase acts as a catalyst or “trigger” that enables luciferin to consume oxygen and thus give off light. The light is used to attract mates and may serve other purposes as well.

Foxfire (glowing wood) is the result of infestation by luminescent fungi.

Depending on the season, chances are you’ll not get to see any naturally created bioluminescence, but using wintergreen lifesavers each student can make some personal sparks.

Sparkies: Pair up and give each participant a lifesaver. Demonstrate how to chew them with your mouth open. If the kids watch closely they should be able to see some sparks! If the lifesaver gets too damp before chewing it will not spark.

How it works:

Wintergreen sparking is not bioluminescence, since lifesavers are not alive. It is a way to make light without electricity. Wintergreen sparking, it’s believed, is actually a three-step process. Step one: When you shatter the sugar crystals with your teeth, electrons (which are negatively charged) break free. As a result, the atoms in which the electrons were formerly embedded become positively charged. In what amounts to a subatomic game of musical chairs, the free electrons dash around madly trying to find a new home. Step two: Meanwhile, as the sugar crystals disintegrate, nitrogen molecules from the air attach themselves to the fractured surfaces. When the free electrons strike the nitrogen molecules, they cause the latter to emit invisible ultraviolet radiation, along with a faint visible glow. Step three: The UV radiation is absorbed by the wintergreen flavoring, methyl salicylate. This then emits the fairly bright blue light you see. Even without the wintergreen flavoring, virtually all crystal sugar candy will emit some visible light when crushed, although it’s usually pretty faint. The effect was first describe in 17th century Italy, and since then it’s been discussed in numerous papers and articles.

C. Stop 3 - Smell/Scent Jars

Since vision is diminished at night for both humans and animals we start using our other senses to compensate for this loss. Humans can smell about 5 million different scents. Each scent has its own receptor cell in our noses. Canines have 220 million smell cells. One can usually estimate the importance of the sense of smell to a particular animal by comparing the size of its nose to its head.

*INSTRUCTOR NOTE:
Some information found in the sight and hearing portions of this lesson plan is similar to information found in Animal Senses Class. If the students have had this class use this time to review that information.*

*INSTRUCTOR NOTE:
Remember to insert the fresh dollar bill in the expert scent jar.*

To focus on our sense of smell, have students guess some scents that vary in difficulty to identify. Have the students close their eyes when smelling so they can concentrate on the scent and aren't cheating by looking into the container if it is light enough to see. Hold the film container under each student's nose for a few seconds. After all have had a chance to smell have them guess what it was.

Scent jar 1 - crayon

Scent jar 2 - pepper

Scent jar 3 - cedar chips

Scent jar 4 - rose

Scent jar 5 - leather

Scent jar 6 - money (expert scent) NOTE: A dollar bill works great. Use a fresh bill from your wallet each time you do this activity. If you store the money in the film container it loses its delicate scent and smells like the container.

Stop 4 - Hearing/Bat & Moth Game

The importance of hearing to a particular animal can be estimated by comparing the size of the ear to the size of the head. The outer flap of the ear works as a receiver for sound. Canines and other animals have much larger "receivers" than we do. They also have the ability to move them independently of each other which allows them to pinpoint a sound with ease. Owls, which do not have outer ear flaps, but they have an acute sense of hearing because their ears are located asymmetrically on their heads. This allows them to triangulate quickly on a sound. Bats use echolocation to help them navigate and find prey. They send out high frequency sound waves (which are too high pitched for people to hear) and these sound waves are bounced back to them off their prey. Try the following game to get a sense of how echolocation works.

Moth and Bat - Bring two or three blindfolds. Have the kids stand in a circle. Pick about four or five kids to be moths. Choose two or three kids to be bats. Blindfold the bats. Place the bats and moths in the circle of the remaining kids. The object is for the bats to catch the moths by tagging them using echolocation. When the bats say "bat" the moths must respond by saying "moth". When all the moths are eaten (tagged), exchange players so all the students get a chance to be a bat or moth.

Stop 5 - Communication/Animal Calling

Most animals use sound to communicate. They may be marking their territory, having a pep rally for an upcoming hunt, looking for a mate, or alerting others of dangers. Try hooting for owls. Four common owls in the Wolf Ridge area are the great horned, barred, saw-whet, and boreal.

Barred Owl - "Who cooks for you? Who cooks for you all?"

Great Horned Owl - Deep, soft, resonant six-noted hoot.

"Whoo! Whoo-whoo-whoo! Whoo! Whoo!"

Boreal Owl - Single melancholy note repeated at one or two minute intervals.

Saw-whet Owl - Sounds like the beeper of a truck backing up.

You can also try howling for wolves. Listen to the tape in the kit at the beginning of class to learn the wolf's howl. Start on a low note and go high.

INSTRUCTOR NOTE
The Bat & Moth Game requires an open area of about 20 to 30 feet in diameter for playing.

CONCEPTS:

- *All living things acquire physical and behavioral adaptations to be successful in their environment.*
- *People can overcome their fear or discomfort of the darkness through knowledge of and familiarity with it.*
- *Humans learn about their world through their senses, by investigation and experimentation.*

Seasonal teachable moments:

In winter, listen to the ice booming. Water contracts as it cools. It is unique among elements in that once it cools to 39°, it starts to expand again, with maximum expansion being reached at 32° when it becomes a solid. As temperatures drop below 32° the ice contracts, pulling away from the shore and cracking. Water fills these cracks and freezes. If the temperature is -20°, and then it begins to warm up, the ice expands and cracks, or wells up having no place to expand into. The booming sound you hear is the ice cracking with expansion or contraction.

In spring and summer, listen for the woodcock. This sandpiper type bird makes a twittering sound, using its wings and voice, during its courtship display.

You may also hear these four common frogs in spring and summer.

- Spring peeper - a “peep!”
- Chorus frog - sounds like finger running up a comb.
- American toad - continuous single noted trill.
- Wood frog - sounds like a chicken. “Buck”

Ruffed grouse make the “drumming” noise you may hear during their breeding season. By rapidly beating their wings in the air they produce a whirring noise that attracts mates and marks territory.

Stop 6 - Solo

Now that the students have a better understanding of night and have spent time out as a group, it is time for them to have a chance to experience the solitude and beauty of night alone. Leave an adult or competent student at the starting point and take the rest of the class along the trail with you leaving a student every 30-40 feet along a trail or in a field and have them sit in silence for five to ten minutes absorbing the night. Instruct the adult or student to start up the trail ten minutes after you leave them picking up each student along the way until the whole group is back together. Double check to make sure you have everyone. Discuss things you may have heard or felt.

V. Conclusion (10 min.)

Discuss solitude solo

Ask them how they felt out there alone and why. Ask them how they would have felt if they had done the solo experience at the beginning of class instead of the end.

Assessment (Outcome 3): Discuss how their emotions about the night have changed after the hike and activities.

Check colored paper squares

Have the students pull out their color squares and see if their color guess was correct. Collect the color squares.

Review

Review the various activities. Discuss what the students may have heard, smelled or seen.

Assessment (Outcome 1): Compare how use of our senses differs in the darkness and light.

Assessment (Outcome 2): Describe something about the night experience that was new and surprising.

VI. Clean-up

Collect colored paper squares from students and band them together. Throw out wrappers from lifesavers. Stack chairs.

VII. Appendices

A. Optional Activities

1. Tell an Indian Legend - "How the Stars got in the Sky"

There weren't always stars up in the sky. According to an Indian legend, there was a time when there were only the animals, the dark sky and the great spirit. The animals were afraid because they could not see at night, so they went to the Great Spirit and asked him to give them some light at night. He told them to each go down to the stream and gather a handful of those little shimmering stones that glitter on the bottom, and to put them up into the sky to make a picture of themselves. He took one stone and placed it in the sky as a guiding star that all of their pictures would revolve around. Well, the little animals tired quickly and some could not reach the sky, so the Great Spirit asked the coyote to help them. He worked hard for awhile, but finally got tired and took the whole bag of stones and threw them up into the sky. Then he realized that he had forgotten his own picture. That helps to explain why some of the pictures are unfinished, and why now and forever, the coyote howls in the night. He forgot to put his picture in the sky.

2. Constellations/Meteors/Northern Lights/Moon

Point out common constellations such as the Big and Little Dippers, Orion, Taurus, Draco, Cassiopeia, etc. Tell constellation stories. Watch for meteor showers especially in July and December. Meteors are small sand-size particles (nickel or iron) that burn up as they begin to enter the earth's atmosphere leaving a trail of light. Sometimes they are called 'falling stars.' Northern lights are caused by charged particles coming from solar storms. These charged particles enter our atmosphere near the poles and excite molecules of oxygen and nitrogen there. As the oxygen and nitrogen 'relax', they emit that energy in the form of light energy. Northern lights are also called aurora borealis. The moon takes 29.5 days to complete a full cycle of phases around the earth. The phase we see depends on

the relative locations of the moon, sun, and earth. A full moon is when the moon is on the far side of the earth from the sun. A new moon is when the moon is between the earth and the sun. The moon rises an average of 50 minutes later each day.

B. Equipment

Six different scent jars
Three blindfolds
Colored paper squares
Wintergreen Lifesavers
Sound tape
Tape player
Candle
Lighter

C. Resources

The Sixth Sense of Animals, Maurice Burton, Taplinger Co. NY 1972.
The Audubon Society Encyclopedia of North American Birds, John K. Terres, Alfred A. Knopf, Inc., NY 1980.
Peterson First Guide to Astronomy, Jay M. Pasachoff, Houghton Mifflin Co., Boston MA 1988.
Nature's Living Lights: Fireflies and Other Bioluminescent Creatures, Alvin and Virginia Silverstein, Brown Little Publications 1988.
Sharing Nature with Children, Joseph Bharat Cornell, Ananda Publications 1979.

D. Safety Management

Instructor will adhere to and be familiar with all safety practices designated by this lesson plan or updated training from a Wolf Ridge permanent staff member. Students will be checked for proper clothing. Travel will be under direction of the instructor with periodic stops and regroupings made to ensure the group remains intact. Instructor shall be familiar with the outdoor program area terrain and be prepared to react to weather changes.

Students shall be informed of all the class activities and agree to the responsibilities and rules for participation. Instructor will be aware of any students' special needs (medical, etc.) and adjust the activities as needed to maintain safety. A first aid kit and telephone are available in the Education Building. Any safety or risk concerns should be brought to the attention of the Wolf Ridge permanent staff.

Emergency Procedures:

For injury: Assess situation. Treat patient and then rest of group. Alert WR and school personnel. Transport patient to safe area. If help is needed for transport contact Office. EMS service is available about 15 minutes from time of call. Ambulance service takes 25 minutes. Alert Office if EMS is used. First aid kits available in all buildings, canoe landings, and beach. Fill out WR emergency report forms. For lost student: Contact WR Office. Search and Rescue will be initiated.

E. Possible Routes (See attached map)

1) Wolf Hill

Down north stairway. Stop at bottom of steps to do candle stare and colored paper squares. Go right. At the Big Trees intersection stop and do the lifesaver activity. Turn left to Wolf Hill, where there is enough space to play Bat & Moth. Also try calling for animals from this point. Continue to your left towards the beaver ecology trail. Stop at this intersection and do scent jars. Head back uphill to the stairs, leaving students along the path for their solo experience.

2) Sawmill Creek Bridge

Go down the north stairway. At the bottom of the stairs do the candle stare, colored paper squares and lifesavers activities. Stop at the intersection that leads to Wolf Hill. Try the scent jar activity. Continue downhill towards the Creek. In the clearing to the right of the beginning of the boardwalk is space for playing Bat & Moth. Walk out to the bridge, try calling animals and discuss the night sky. On your return, scatter students along the trail for the solo experience as you head back up to the buildings.

3) Wolf Lake Canoe Landing

Walk down the driveway to the hairpin intersection trailhead. Do the candle stare and colored paper squares and lifesaver activities there. Continue to the benches at the top of the stairs and try the scent jar activity. At the four-way intersection play Bat & Moth. Follow the signs to the canoe landing. Observe the night sky and try calling animals. Leave students scattered along the trail from the canoe landing to the first intersection for their solo time.

4) Raven Lake

(NOT DURING SKI SEASON)

Stop at the Ridge orienteering start post and do the candle stare and hand out the colored paper squares. At the intersection with the perimeter trail do the lifesaver activity. At the benches do the scent jar activity. Bat & Moth can be played at the clearing by the Ski/Wetland Chalet. At Raven Lake try calling for animals and observe the night sky. When returning to the Chalet, scatter the kids along the trail for their solo experience.

5) Wolf Lake Voyageur Dock

At the intersection with the perimeter trail do the candle stare colored paper squares activity. Do the lifesaver activity at the top of the stairs at the benches. Play Bat & Moth at the four-way intersection or on Wolf Lake in winter. At the lake observe the night sky and call animals. On return trip do scent jars at the four way intersection. At the perimeter trail and return trail intersection go right towards the Ojibwa site scattering students for solo time. Take a left back towards the buildings.